

## Novel High Pressure Pump-on-a-Chip Technology, Phase II

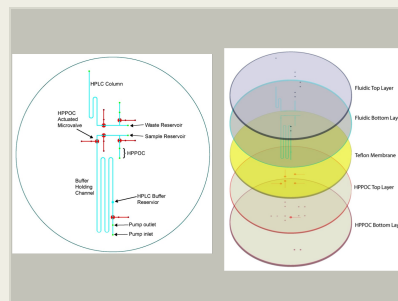
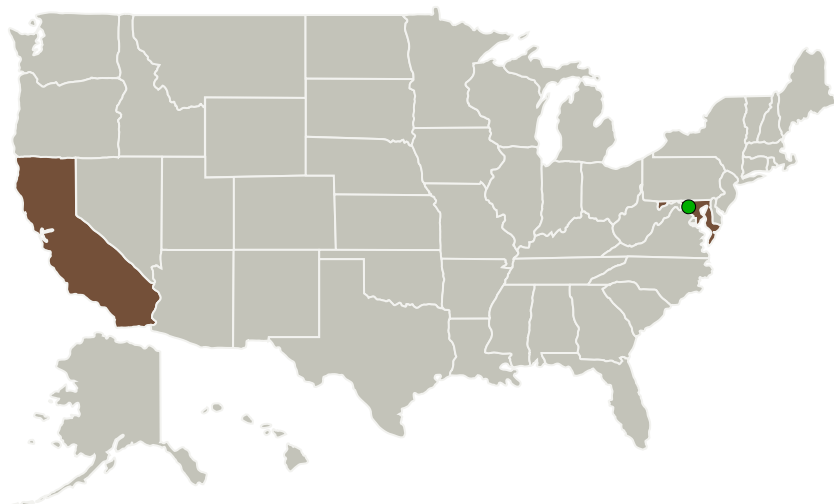
Completed Technology Project (2013 - 2016)



## Project Introduction

HJ Science & Technology, Inc. proposes to develop a novel high pressure "pump-on-a-chip" (HPPOC) technology capable of generating high pressure and flow rate on the microchip level. When combined with a "valve-on-a-chip" (VOC) platform, HPPOC is naturally suited for NASA planetary science applications including on-chip HPLC sample manipulation and analysis. In Phase I, we have established the technical feasibility of the technology by fabricating a set of HPPOC chips and successfully demonstrating the required maximum pressures and flow rates. In addition, we have also established a novel HPPOC actuated VOC platform. In Phase II, we will construct, test, and deliver a high performance and low power consumption microfluidic sample manipulation manifold prototype. In particular, we will build an integrated on-chip HPLC buffer and sample injection pump and valve manifold specifically engineered to support the chip-based LC-MS research effort at GSFC. In addition, the Phase II work will also be performed in parallel with efforts to develop such manifolds for the commercial analytical markets.

## Primary U.S. Work Locations and Key Partners



Novel High Pressure Pump-on-a-Chip Technology Project Image

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Organizations Performing Work	Role	Type	Location
HJ Science & Technology, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Berkeley, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

## Primary U.S. Work Locations

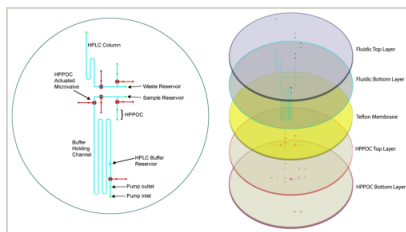
California	Maryland
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## Project Transitions

▶ **January 2013:** Project Start

✓ **January 2016:** Closed out

## Images



## Project Image

Novel High Pressure Pump-on-a-Chip Technology Project Image  
(<https://techport.nasa.gov/image/128845>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

HJ Science & Technology, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Hong Jiao

**Co-Investigator:**

Hong Jiao

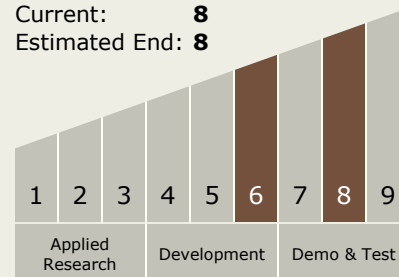
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### Technology Maturity (TRL)

Start: 6  
Current: 8  
Estimated End: 8



### Technology Areas

#### Primary:

- TX08 Sensors and Instruments
  - └ TX08.3 In-Situ Instruments and Sensors
  - └ TX08.3.4 Environment Sensors

### Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System